

-- REMARKS --

Claim 1 to 15 are presently pending in the subject patent application. The Applicant has amended the claims to more clearly define the scope of the invention, and to correct typographical errors and antecedent defects in the claims.

Claim 1 stands rejected under 35 USC 112, second paragraph. Claims 1 to 6 stand rejected under 35 USC 102(e) for being anticipated by Suesada (US 5,986,614). Claims 7 to 9 and claims 11 to 15 stand rejected under 35 USC 103(a) for being obvious having regard to Suesada in view of Woloszczuk (US 4,912,482). Claim 10 stands rejected under 35 USC 103(a) for being obvious having regard to Suesada in view of Woloszczuk and Parham (US 4,896,162).

For the reasons set out below, the Applicant submits that the Examiner's indefiniteness objection to claim 1 has been overcome. The Applicant submits that the invention as recited in claims 1 to 6, as amended, is not anticipated by Suesada. The Applicant also submits that the Examiner failed to make out the requisite *prima facie* case of obviousness to properly reject claims 7 to 15 under 35 USC 103(a). Accordingly, the Applicant submits that the Examiner's rejection of the claims under 35 USC 112 second paragraph, 35 USC 102(e) and 35 USC 103(a) should be withdrawn.

1. INDEFINITENESS REJECTIONS

The Examiner submitted that claim 1 was vague since it was not clear how the interface terminal could be electrically isolated from the radiating plate when both were coupled to the resonant network. As will be apparent from the capacitive and inductive elements of the resonant network, the antenna does not present an infinite stop-band. As such, at some frequencies the interface terminal will be electrically isolated from the ground plane and the radiating plate. Nevertheless, for enhanced clarity, the Applicant has amended independent claim 1 in accordance with independent claim 8 by deleting this aspect from the claim.

The Examiner also identified typographical errors in claim 1 (antennae), and claims 3 to 5 (inductors). The Applicant has amended claim 1 and claims 3 to 5, as set out above. The Applicant submits that, with these amendments, the Examiner's objections under 35 USC 112 to claim 1 and claims 3 to 5 have been overcome. Accordingly, the Applicant respectfully requests withdrawal of the Examiner's objection under 35 USC 112 to claim 1 and claims 3 to 5.

2. ANTICIPATION REJECTION

As discussed above, the Examiner submitted that the flat-plate monopole antenna recited in claims 1 to 6 of the subject patent application was anticipated by Suesada (US 5,986,614). The Applicant submits that the Examiner's objection to claims 1 to 6 has been traversed.

a) Flat-plate monopole antenna: (claims 1 to 6)

Independent claim 1 of the subject patent application, as amended herein, recites a flat-plate monopole antenna that comprises:

- a conductive ground plane;
- a conductive radiating plate spaced apart from the ground plane and, together with the ground plane, defining a cavity therebetween;
- an antenna interface terminal in communication with the cavity; and
- a resonant network for defining operating characteristics of the antenna, the resonant network including a first inductive element electrically coupled to the interface terminal and the radiating plate, and a second inductive element electrically coupled to the interface terminal and the ground plane.

As will be apparent from the foregoing claim, both of the recited inductive elements are coupled at one end to the interface terminal, and are coupled at the opposite end to the radiating plate or the ground plane. As a result, the resonant network recited in independent claim 1 comprises a three-port parallel inductive tuning circuit.

A schematic representation of the three-port parallel inductive tuning circuit is shown in Fig. 1, attached to the end of this response.

Suesada does not describe a flat-plate monopole antenna having a three-port parallel inductive tuning circuit, and therefore, does not describe a flat-plate monopole antenna having the resonant network recited in independent claim 1 of the subject patent application.

b) Suesada (US 5,986,614)

Suesada describes a compact antenna device that includes a first printed circuit board (PCB) and a ground plate arranged in parallel. A second PCB is arranged vertically between the first PCB and the ground plate. A ground electrode and a transmission line are mounted on the second PCB. The ground plate is connected to the ground electrode.

A two-terminal antenna body is mounted on the second PCB. A capacitive load conductor mounted on the first PCB is connected to one terminal of the antenna body. The other terminal of the antenna body is connected to one end of the transmission line. The other end of the transmission line is connected to a signal source. The antenna body includes a meandering conductor, formed on glass epoxy, and connected at each end to one of the antenna body terminals.

Suesada does not describe or depict a flat-plate monopole antenna having a resonant network that includes a first inductive element electrically coupled to a communications interface terminal and a radiating plate, and a second inductive element electrically coupled to the interface terminal and the antenna ground plane. Instead, Suesada describes an antenna having a resonant network that includes a first inductive element electrically connected between an interface terminal (one end of the transmission line) and the radiating plate (the first PCB), and a second inductive element (the meandering conductor) electrically connected between the radiating plate and the antenna ground plate. The opposite end of the transmission line interfaces with a signal source so as to allow the antenna to transmit electromagnetic signals.

A schematic representation of the resonant network described by Suesada is shown in Fig. 2 , attached to the end of this response.

As will be apparent by comparison with Fig. 1, the resonant network described by Suesada is not a three-port parallel inductive tuning circuit. Therefore, the flat-plate monopole antenna recited in independent claim 1 of the subject patent application is not anticipated by Suesada. Accordingly, the Applicant requests withdrawal of the Examiner's objection under 35 USC 102(e) to claims 1 to 6.

3. OBVIOUSNESS REJECTIONS

As discussed above, the Examiner submitted that the wireless communications device recited in claims 8, 9 and 11 to 15 of the subject patent application was obvious having regard to Suesada in view of Woloszczuk. The Examiner also submitted that the wireless communications device recited in claim 10 was obvious having regard to Suesada in view of Woloszczuk and Parham. The Applicant disagrees with the Examiner's assessment.

Obviousness Generally

In order to sustain a *prima facie* obviousness rejection to a claim under 35 USC 103(a) based on a modification to a cited reference, there must be some motivation or suggestion in the prior art for the modification. As the Court of Appeals for the Federal Circuit explained in *re: Gordon* (221 USPQ 1125, 1127 (CAFC. 1984), the mere fact that the prior art could be modified to arrive at the inventor's invention is not germane. Rather, the appropriate inquiry under 35 USC 103(a) is whether the prior art would have suggested the desirability of the modification.

Further, since all the words in a claim must be considered when judging patentability, to sustain a *prima facie* obviousness rejection all the claims limitations must be taught or suggested by the prior art: In *re Royka*, 180 USPQ 580, 583 (CCPA 1974). And, as the Court of Appeals for the Federal Circuit articulated in *Re Sang-Su Lee* 00-1158, Serial No. 07/631,240, January 18, 2002, there must be some concrete **evidence** in the record for the motivation or suggestion.

As the Applicant will explain, the Examiner failed to produce any evidence of suggestion or motivation for a solution having all the claim limitations recited herein. Accordingly, the invention recited in claims 7 to 15 of the subject patent application is not obvious in view of the cited art.

a) Wireless Communications Device: (claims 8 to 15)

Independent claim 8 of the subject patent application, as amended herein, recites a wireless communications device that comprises:

- a conductive casing for receiving wireless communications hardware therein, the conductive casing including an antenna communications port for interfacing with the communications hardware;

- a conductive radiating plate spaced apart from the casing and, together with the ground plane, defining an antenna; and

- a resonant network for defining operating characteristics of the antenna, the resonant network including a first inductor electrically coupled between the radiating plate and the communications port, and a second inductor electrically coupled between the communications port and the casing.

As will be apparent from the foregoing claim, both of the recited inductors are coupled at one end to the communications port, and are coupled at the opposite end to the radiating plate or the conductive casing. As described in the subject patent application, the communications port interfaces with communications hardware disposed within the casing and allows the communications hardware to transmit and receive electronic signals via the antenna. As a result, the resonant network recited in independent claim 8 comprises a three-port parallel inductive tuning circuit. The art cited by the Examiner fails to provide any teaching or suggestion of a wireless communications device having a conductive casing, a conductive radiating plate, and a three-port parallel inductive tuning circuit for defining operating characteristics of the antenna.

(i) Suesada

As discussed above, Suesada describes an antenna having a resonant network that includes a first inductive element electrically connected between one end of the transmission line and the radiating plate (the first PCB), and a second

inductive element (the meandering conductor) electrically connected between the radiating plate and the antenna ground plate. Suesada fails to describe or depict a wireless communications device having a conductive casing, a conductive radiating plate, and a resonant network that includes a first inductor electrically coupled between a communications port and the radiating plate, and a second inductor electrically coupled between the communication port and the conductive casing.

(ii) Woloszczuk

Woloszczuk describes an antenna comprising an array of radiating/receiving monopoles, each disposed within a respective electrically-conductive cell. The cells are arrayed in a honeycomb arrangement, with each row of cells being separated by the row above/below by a horizontal triplate structure. The triplate structure comprises a pair of conductive plates separated by a dielectric, and a conductor disposed between the conductive plates for coupling to the monopoles.

Each cell has one open side, a vertical conductive back plate, and shares a common vertical conductive wall with the adjacent cell(s). Each monopole comprises a vertical triangular plate separated from the back plate. The patentee discloses that this arrangement reduces mutual coupling between the monopoles.

(iii) Parham

Parham describes a monopole antenna comprising a series of intermediate conductive segments disposed above a ground plane, a series of upper conductive segments disposed above the first conductive segments, and a dielectric disposed between the conductive segments and the ground plane. As a result, a series of capacitors are formed by the conductive segments and the ground plane. The intermediate conductive segments are also coupled to ground by respective inductors. The inductors form tuned circuits with the capacitors, tuned to the middle of the passband.

(iv) Relevance of Suesada, Woloszczuk and Parham

Suesada describes an antenna having a resonant network that includes a first inductive element electrically connected between one end of the transmission line and the radiating plate, and a second inductive element electrically connected between the radiating plate and the antenna ground plate. Suesada does not describe or depict a wireless communications device having a conductive casing, a conductive radiating plate, and a resonant network that includes a first inductor electrically coupled between a communications port and the radiating plate, and a second inductor electrically coupled between the communication port and the conductive casing.

Woloszczuk describes an antenna comprising an array of radiating/receiving monopoles, each disposed within a respective electrically-conductive cell. A schematic representation of the antenna array described by Woloszczuk is shown in Fig. 3, attached to the end of this response.

As will be apparent by comparison with Fig. 1, the antenna array described by Woloszczuk does not include a three-port parallel inductive tuning circuit.

Woloszczuk does not even suggest the use of a resonant network that includes a first inductor electrically coupled between the vertical triangular plate and the conductor that is disposed between the conductive plates, and a second inductor electrically coupled between the conductor and the back plate. As such, Woloszczuk does not suggest modifying Suesada so as to include a resonant network comprising a first inductor electrically connected between one end of the transmission line and the radiating plate, and a second inductor electrically connected between the radiating plate and the antenna ground plate.

Parham describes a monopole antenna comprising a series of conductive segments disposed above a ground plane. A schematic representation of the monopole antenna described by Parham is shown in Fig. 4, attached to the end of this response.

As will be apparent by comparison with Fig. 1, the monopole antenna described by Parham does not include a three-port parallel inductive tuning circuit. Parham does not even suggest the use of such a tuning circuit.

Further, the Applicant points out that Suesada discloses that the object of the invention described therein is to product a compact antenna device for use in a mobile telephone. The height of the antenna device can be lowered since the design is able to maintain the inductance L and the resistance R of the antenna body constant, while increasing the capacitance C of the antenna body. If the antenna device described by Suesada was modified by the teaching of Woloszczuk, the antenna body described by Suesada would be replaced by the antenna array described by Woloszczuk, thereby causing the antenna device described by Suesada to increase in size. A person of ordinary skill would not be motivated to modify the antenna device described by Suesada with the teaching of Woloszczuk since the size reduction goal envisaged by Suesada would be compromised.

The Examiner failed to produce any evidence of suggestion or motivation for a wireless communications device having all the claim limitations recited in independent claim 8 of the subject patent application. In view of this deficiency, and the fact that the cited art fails to include any suggestion or motivation for a wireless communications device having all the claim limitations recited in independent claim 8, the Applicant submits that the wireless communications device recited in independent claim 8 is not obvious in view of the cited art.

Since dependent claims 9 to 15 depend from claim 8, the foregoing comments apply equally to claims 9 to 15. Therefore, the Applicant submits that the wireless communications device recited in dependent claims 9 to 15 is not obvious in view of the cited art. Accordingly, the Applicant respectfully requests withdrawal of the Examiner's objection under 35 USC 103(a) to claims 8 to 15.

b) Flat-plate monopole antenna: (claim 7)

The Examiner submitted that the flat-plate monopole antenna recited in dependent claim 7 of the subject patent application was obvious having regard to Suesada in view of Woloszczuk. The Applicant disagrees with the Examiner's assessment.

Claim 1 of the subject patent application depends from independent claim 1. The latter claim recites a flat-plate monopole antenna that comprises:

a conductive ground plane;
a conductive radiating plate spaced apart from the ground plane and, together with the ground plane, defining a cavity therebetween;
an antenna interface terminal in communication with the cavity; and
a resonant network for defining operating characteristics of the antenna, the resonant network including a first inductive element electrically coupled to the interface terminal and the radiating plate, and a second inductive element electrically coupled to the interface terminal and the ground plane.

(i) Relevance of Suesada, Wołoszczuk and Parham

As discussed above, Suesada does not describe or depict a flat-plate monopole antenna having a resonant network that includes a first inductive element electrically coupled to a communications interface terminal and a radiating plate, and a second inductive element electrically coupled to the interface terminal and the antenna ground plane.

Wołoszczuk does not describe incorporating within each conductive cell a resonant network that includes a first inductor electrically coupled between the vertical triangular plate and the conductor that is disposed between the conductive plates, and a second inductor electrically coupled between the conductor and the back plate. Therefore, Wołoszczuk does not suggest modifying Suesada so as to include a resonant network comprising a first inductive element electrically connected between one end of the transmission line and the radiating plate, and a second inductive element electrically connected between the radiating plate and the antenna ground plate.

Similarly, Parham does not suggest modifying Suesada so as to include a resonant network comprising a first inductive element electrically connected between one end of the transmission line and the radiating plate, and a second inductive element electrically connected between the radiating plate and the antenna ground plate.


Further, Suesada discloses that the object of the invention described therein is to product a compact antenna device for use in a mobile telephone. If the antenna device described by Suesada was modified by the teaching of Wołoszczuk, the

antenna body described by Suesada would be replaced by the antenna array described by Woloszczuk, thereby causing the antenna device described by Suesada to increase in size. A person of ordinary skill would not be motivated to modify the antenna device described by Suesada with the teaching of Woloszczuk since the size reduction goal envisaged by Suesada would be compromised.

The Examiner failed to produce any evidence of suggestion or motivation for a solution having all the claim limitations recited in independent claim 1 of the subject patent application herein. Since dependent claim 7 depends from claim 1, the foregoing comments apply equally to claim 7. In view of the foregoing, the Applicant submits that the flat-plate monopole antenna recited in dependent claim 7 is not obvious in view of the cited art. Accordingly, the Applicant respectfully requests withdrawal of the Examiner's objection under 35 USC 103(a) to claim 7.

For the foregoing reasons, the Applicant respectfully submits that the claimed invention is patentable over the prior art. Reconsideration and allowance of the claims is respectfully requested.

Respectfully submitted,
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